needed to fully understand the mechanistic and causative links between environmental agents and the various forms of autoimmune disease. Says Jerrold Heindel, a program administrator in the NIEHS Organs and Systems Toxicology Branch, "This was the first time that this kind of broad group ever got together [to discuss autoimmune disease]." Heindel says the workshop allowed for a stimulating exchange of ideas and perspectives as representatives from diverse fields compared their perceptions of the problems that need to be addressed in order to move ahead with research.

"A major aim of the workshop was to look for common threads that would make it easier to define the mechanism of autoimmune diseases and the role of environmental agents," says Heindel. "No significant common threads were noted [at the workshop], which means that we still have to examine each disease individually, which makes for a much bigger problem. We still hope that, as more data are accumulated, common threads will appear."

Perhaps the most pressing need identified at the workshop is for a nationwide surveillance system to establish the occurrence of autoimmune disease. Such a system would also help identify clusters that might be associated with a particular environmental exposure, cohorts for study, and susceptible populations. Dori Germolec, a group leader of the NIEHS Environmental Immunology Laboratory, says, "Many people agreed we need a better nationwide registry for autoimmune diseases, both the specific diseases themselves and autoimmune diseases as a whole."

Genetic factors have been shown to play a role in the development of autoimmune diseases. For example, in a review article published in the 3 May 1996 issue of *Cell*, Timothy J. Vyse of the National Jewish Center for Respiratory Medicine and Immunology in Denver, Colorado, and John A. Todd of the Wellcome Trust Centre for Human Genetics in Oxford, United Kingdom, used maps of markers covering the mouse, rat, and human genomes to identify 38 genes that predispose humans and experimental animals to autoimmune disorders. But, as Glinda Cooper, an epidemiologist with the NIEHS Environmental Diseases and Medicine Program, pointed out at the workshop, that does not negate the possible role of environmental agents in the initiation or exacerbation of disease. "It's not [a matter of] 'genetics versus environment,'" she says. "As researchers, our goal is to understand the interaction between genes and the environment."

A palette of environmental factors have been posited as possibly triggering various autoimmune disorders. For instance, exposure to chemicals such as dioxins and polychlorinated biphenyls has been linked with non-Hodgkin's lymphoma, while certain dietary factors seem to contribute to type 1 diabetes. Other environmental suspects include ultraviolet radiation (multiple sclerosis), cross-reactivity with environmental antigens (type 1 diabetes), ionizing radiation (systemic lupus erythematosus), stress (rheumatoid arthritis), and exposure to heavy metals such as lead and mercury (autoimmune glomerulonephritis).

There is also a need, said workshop participants, to develop and identify research tools such as biomarkers of disease that are amenable to both animal and human studies, questionnaires for epidemiologic and clinical tests, and testing strategies to screen chemicals for the potential to initiate or exacerbate autoimmune disease. In an article published in the March 1995 issue of *Immunology Today*, Argyrios N. Theofilopoulos, an immunologist at the Scripps Research Institute in La Jolla, California, predicted that "the definition of [autoimmune] diseases is about to be revolutionized by the development of genome scanning approaches, such as dense chromosomal maps based on polymorphic microsatellite DNA and other informative markers."

The findings of the breakout groups will be compiled into a list of research recommendations that will be distributed to NIH institutes, interested foundations, and the research community. Says Mary Jane Selgrade, chief of the Immunotoxicology Branch at the NHEERL, "It is our hope that the data gaps and needs the workshop participants have identified will stimulate research into the next decade."

Talk of the Towns

In the belief that dialogue is the first step to resolving the environmental problems society currently faces, the NIEHS has instituted a series of regional town meetings to be hosted by various NIEHS Environmental Health Sciences Centers. These meetings are aimed at giving a voice to the myriad groups (including local, state, and federal health officials, policy makers, academicians, and members of the community) interested in public health and the environment.

The first town meeting was held 17–18 September 1998 and was hosted by the Environmental and Occupational Health Sciences Institute, a program of the University of Medicine and Dentistry of New Jersey–Robert Wood Johnson Medical School and Rutgers University. This event set the goals for the planned series of town meetings. The primary goal is to provide a platform for open dialogue to encourage better coordination among the health professionals working on community exposures, industrial exposures and pesticides, site-specific exposures and cluster issues, and other environmental issues that impact human health. A secondary goal is to promote local and state media coverage of environmental health to broaden public understanding.

Three more town meetings (listed below) are currently scheduled around the United States, and more are planned for later in 1999.

19–20 January 1999
"Preventing Environmental Disease: Barriers and Solutions"
Cincinnati Museum Center
Cincinnati, Ohio
Contact: 513-558-5439

19 February 1999 (date tentative)
"Disease End Points in Children"
University of California at Berkeley
Berkeley, California
Contact: 510-643-9815